Computational tools in algebraic geometry are key to generating new conjectures and providing a means for solving problems in applications such as integrable systems and optimization. Recent features in Sage (http://www.sagemath.org) for performing computations with Riemann theta functions and algebraic curves provide steps towards solving a large class of these problems. In this talk we will discuss current and future developments in Sage for computational algebraic geometry and examine two applications in particular: generating genus two and three solutions to the Kadomstev–Petviashvili equation and computing determinantal representations of homogenous plane curves. (Received August 30, 2011)